Brucellosis

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To assist in the diagnosis and treatment of cases.
2. To identify potentially exposed health care and laboratory personnel and to provide counseling.
3. To identify sources of transmission (e.g., an infected animal or a contaminated unpasteurized dairy product) and to prevent further transmission from such sources.
4. To raise the index of suspicion of a possible bioterrorism event if no natural exposure source is identified.

B. Legal Laboratory Reporting Requirements

1. Health care providers: **immediately notifiable to local health jurisdiction.**
2. Hospitals: **immediately notifiable to local health jurisdiction**.
3. Laboratories: notifiable to local health jurisdiction within 2 workdays; specimen submission required.
4. Veterinarians: **immediately notifiable to the Washington State Department of Agriculture or to the local health jurisdiction.**
5. Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology Section (CDES) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. **If bioterrorism is suspected, immediately report the case to DOH: 1-877-539-4344.**
2. Facilitate the transport of specimens to DOH Public Health Laboratories (PHL) for confirmatory testing.
3. Educate potentially exposed persons, including laboratory personnel, about signs and symptoms of disease; recommend antibiotic prophylaxis as needed.
4. Report all *probable* and *confirmed* cases to CDES (see definitions below). Complete the brucellosis report form (http://www.doh.wa.gov/notify/forms/brucellosis.doc) and enter the data in the Public Health Issues Management System (PHIMS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Brucellosis is caused by gram-negative bacteria in the genus *Brucella*. Species known to cause disease in humans include *Brucella abortus, B. melitensis, B. suis*, and rarely *B. canis*. Cattle vaccines used in the United States are attenuated strains of *Brucella abortus* and can also cause human illness.

B. Description of Illness

A systemic bacterial disease with acute or insidious onset, characterized by continued, intermittent or irregular fever of variable duration; headache; weakness; profuse sweating; chills; arthralgia (joint pains); depression; weight loss and generalized aching. Infections or abscesses of organs, including the liver and spleen, and subclinical disease can occur. The disease may last for several days, months or occasionally longer if not adequately treated. Osteoarticular complications occur in 20–60% of cases, most commonly sacroiliitis. Genitourinary involvement occurs in 2–20% of cases, orchitis and epididymitis in particular. The case-fatality rate of untreated brucellosis is low, with rare deaths due to endocarditis caused by *B. melitensis.*

C. Brucellosis in Washington State

Although brucellosis has been eradicated from cattle in Washington since 1988, DOH receives 0 to 3 reports of human brucellosis infections each year, reflecting primarily ingestion of raw milk products in foreign countries. In years past, a live vaccine was used in animals and veterinarians were occasionally exposed to it. The newer vaccines (since 1996) do not pose as great a risk, however contact CDES if a veterinarian reports a vaccine exposure.

D. Reservoirs

Predominantly cattle, goats, sheep and swine. Infection may occur in bison, elk, caribou and some species of deer. *B. canis* is an occasional problem in laboratory dog colonies and kennels, stray dogs, pet dogs with outdoor exposures, and coyotes.

E. Modes of Transmission

Infection results from contact (through breaks in the skin) with tissues, blood, urine, vaginal discharges, aborted fetuses and especially placentas, and by ingestion of raw milk and unpasteurized dairy products from infected animals. Airborne infection occurs in laboratories and abattoirs. Clinical specimens and laboratory isolates can present a risk to health care or laboratory workers.

F. Incubation Period

Highly variable; usually 5–60 days; occasionally several months.

G. Period of Communicability

Direct person-to-person spread of brucellosis is extremely rare. Mothers who are breast-feeding may transmit the infection to their infants. Sexual transmission has also been reported.

H. Treatment

In general, persons with brucellosis should be treated with a combination of appropriate antibiotics for a prolonged period of time.

3. CASE DEFINITIONS

A. Clinical Description

An illness characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache, and arthralgia.

B. Laboratory Criteria for Diagnosis

1. Isolation of *Brucella* spp. from a clinical specimen, or
2. Fourfold or greater rise in *Brucella* agglutination titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 weeks apart and studied at the same laboratory, or
3. Demonstration by immunofluorescence of *Brucella* spp. in a clinical specimen

C. Case Definition (1997)

1. Probable*:* a clinically compatible case that is epidemiologically linked to a confirmed case or that has supportive serology (i.e., *Brucella* agglutination titer of greater than or equal to 160 in one or more serum specimens obtained after onset of symptoms)
2. Confirmed*:* a clinically compatible illness that is laboratory confirmed

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

Brucella can be isolated from blood, bone marrow, and other tissues/fluids. It is a highly infectious organism, and is known to cause infection in laboratory workers. Laboratory personnel should be alerted when specimens are sent for suspect brucellosis. Intense caution should be used to avoid exposure within the laboratory by aerosol. **Confirmatory laboratory testing must be performed by a reference laboratory such as the Washington State Public Health Laboratories (PHL).**

The diagnosis of brucellosis can also be made by acute and convalescent serological studies. A single convalescent specimen can be tested, but results may be inconclusive. Specific serologic techniques are needed for *B. canis* antibodies, which do not cross-react with other *Brucella* species.

Recently, rapid diagnostic tests have been developed since *Brucella* is under surveillance for bioterrorism.

B. Tests Available at PHL

PHL provides identification of *Brucella* from pure isolates as well as culturing of clinical specimens. PHL will also determine the species of the organism if isolated. Serologic tests are not performed at PHL but will be forwarded to Centers for Disease Control and Prevention (CDC) for testing. PHL also performs rapid diagnostic testing in suspected bioterrorism situations. Contact CDES for approval prior to collection and shipment of specimens.

C. Specimen Collection

1. Isolates:

   Clinical laboratories need to call PHL prior to shipping isolates (206-418-5400). Isolates should be submitted with a completed PHL Reference Bacteriology Examinations form (http://www.doh.wa.gov/EHSPHL/PHL/Forms/ReferenceBacteriology.pdf).

2. Serology:

   For antibody testing, collect 1–2 ml of both acute and convalescent sera. Ship cold, not

frozen with the PHL serology form (http://www.doh.wa.gov/EHSPHL/PHL/Forms/Serology.pdf).

5. ROUTINE CASE INVESTIGATION

Interview the case and others who might be able to provide pertinent information.

A. Evaluate the Diagnosis

Review the clinical presentation and laboratory results. **Confirmatory laboratory testing should be performed by a reference laboratory such as DOH Public Health Laboratories.** Facilitate submission of laboratory specimens to PHL for confirmation. Proceed with investigation after preliminary or confirmatory laboratory results are available for sporadic cases. During an outbreak event or a potential bioterrorism situation, start the investigation before laboratory results are available.

B. Identify Potential Sources of Infection

Investigate possible exposures during the period 5 to 60 days before onset, including a history of:

1. Travel to *Brucella* endemic areas (including the Mediterranean Basin, South and Central America, Eastern Europe, Asia, Africa, the Caribbean, and the Middle East);
2. Consumption of unpasteurized milk products;
3. Contact with potentially infected animals or their tissues, particularly postpartum fluid or tissues;
4. Parenteral or mucous membrane *Brucella* vaccine exposure;
5. Work in laboratory.

C. Identify Potentially Exposed Persons

1. Identify persons who participated with the case in any of the activities listed above and contact them, as well as any acquaintance or household member with similar illness. If any are ill, inform them (or their physician) of possible exposure, in order to facilitate proper diagnosis and therapy.
2. Identify laboratory workers who handled specimens or laboratory isolates and educate them of symptoms of illness to facilitate diagnosis.
3. See "Management of Exposed Persons" below for prophylactic antibiotic recommendations.

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations

Hospitalized patients should be cared for using standard precautions.

B. Case Management: No follow-up is needed.

C. Contact Management:

None since the infection is not routinely spread person-to-person.

D. Management of Exposed Persons

All laboratories handling specimens with confirmed *Brucella* should be investigated. Recommendations for risk assessment, post-exposure prophylaxis and follow-up of laboratory personnel exposed to pathogenic *Brucella* species can be found at http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm#recommendations.

Call CDES to discuss the need for post-exposure prophylaxis for other persons exposed.

E. Environmental Measures

1. If the source of infection appears to be domestic animals, notify Washington State Department of Agriculture. WSDA will conduct an animal disease investigation and determine the need for animal testing.
2. If the source of infection appears to be wild animals, notify the Washington Department of Fish and Wildlife.

7. MANAGING SPECIAL SITUATIONS

A. Bioterrorist Event

Brucella has been classified as a "category A" agent (of greatest concern) for bioterrorism because it can be easily disseminated by aerosol and has the capacity to cause severe illness and death. An intentional release (bioterrorist event) should be suspected if unusual clusters are seen in otherwise healthy individuals or in people in buildings with common ventilation systems. **Call CDES immediately if brucellosis is suspected.**

8. ROUTINE PREVENTION

A. Immunization Recommendations

No human *Brucella* vaccine is currently available commercially.

B. Prevention Recommendations

1. **Avoid raw dairy foods.** Do not consume unpasteurized milk, cheese, or ice cream, especially while traveling. If you are not sure that the dairy product is pasteurized, don't eat it.
2. **Avoid contact with sick or dead animals.** If you hunt, wear gloves when handling dead animals. When skinning wild game keep gloves away from eyes and other mucous membranes. Thoroughly wash hands after handling wild game carcasses. Wild game meat should be cooked “well done” (to at least 74°C/165°F).
3. **Wear gloves.** Veterinarians, farmers and hunters should wear gloves when handling sick or dead animals or when assisting an animal giving birth.
4. **Take safety precautions.** Laboratory workers should handle all specimens under appropriate biosafety conditions.
5. **Immunize domestic animals.** Although vaccination for brucellosis isn't mandatory, many farmers and ranchers vaccinate their herds, and milk is tested two to four times a year for signs of the bacteria.

   For more information, see:
   http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm#faqbrucellarb51

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UPDATES